UNITED STATES PATENT AND TRADEMARK OFFICE

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ART UNIT	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

Office Action Summary	Application No.	Applicant(s)
	09/809,562	HENDLER, HILLEL
	Examiner	Art Unit
	Christine Ng	2663

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _16 September 2005_.

2a)☒ This action is **FINAL.**   2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-5,7-20,22-25 and 27-34_ is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) _18 and 19_ is/are allowed.

6)☒ Claim(s) _1-5,7-17,20,22-25,27-30 and 34_ is/are rejected.

7)☒ Claim(s) _31-33_ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _14 March 2001_ is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☐ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2.   Claims 1, 2, 4, 7 and 10-15 are rejected under 35 U.S.C. 103(a) as being

unpatentable over U.S. Patent No. 5,859,842 to Scott in view of U.S. Patent No.

5,418,452 to Pyle.

Referring to claim 1, Scott discloses in Figure 2 a communication method

comprising the steps:

Receiving (at antennas 130,131) multiple signals (antenna signals 140,141).

Refer to Column 3, lines 51-55.

Multiplexing (at summer 151) the signals (antenna signals 140,141). Refer to

Column 4, lines 34-35.

Transporting the multiplexed signals through a single chain (backhaul cable 152).

Refer to Column 4, lines 35-37.

Demultiplexing (at splitter 160) the signals (antenna signals 140,141). Refer to

Column 4, lines 50-52.

Using each of demultiplexed signals (antenna signals 166,167) in a related

application (antenna diversity). Refer to Column 4, line 66 to Column 5, line 12 and

Column 8, line 32 to Column 9, line 10.

Scott does not disclose that said step of multiplexing comprises multiplexing the

multiple signals at a sampling rate greater than n*Fs, where n is the number of signals

and Fs is a Nyquist sampling rate for a single signal.

Pyle discloses in Figure 1 a multiplexer 18 that multiplexes 8 signals 16A-16H.

The clock signal on line 30 must satisfy the Nyquist sampling criterion for sampling.

Specifically, the frequency of the clock signal on line 30 must be at least 16 times as

high as the transition rate for the fastest input line 16, since MUX 18 has 8 inputs and

each signal must be sampled at least twice as fast as its transition rate. Refer to

Column 2, lines 24-41 and Column 4, lines 37-52. Pyle also discloses another example

in Figure 4 of MUXes 50 and 56. The fastest signal input into MUX 50 has a frequency

of 1 kHz, so the sampling signal on clock input 56 must have a frequency of at least 16

kHz. The fastest signal input into MUX 45 has a frequency of 2 kHz, so the sampling

signal on clock input 46 must have a frequency of at least 32 kHz.   Refer to Column 5,

line 44 to Column 6, line 5. In all of these cases, the MUX samples the signals at n*Fs,

where Fs is the Nyquist sampling rate of the fastest signal and n is the number of

signals (8). Therefore, it would have been obvious to one of ordinary skill in the art at

the time the invention was made to include said step of multiplexing comprises

multiplexing the multiple signals at a sampling rate greater than n*Fs, where n is the

number of signals and Fs is a Nyquist sampling rate for a single signal; the motivation

being that sampling at the Nyquist sampling rate avoids the problem of aliasing and

interference between samples and ensures that all signals are sampled often enough.

Refer to Column 4, lines 45-52. Furthermore, since the MUX multiplexes n signals and

each signal must be sampled at the Nyquist sampling rate, the total output of the MUX

is n multiplied by the Nyquist sampling rate.

Referring to claim 2, Scott discloses in Figure 2 that the step of receiving

comprises receiving each of the multiple signals (antenna signals 140,141) on a

separate antenna (antennas 130,131). Refer to Column 3, lines 51-55.

Referring to claim 4, Scott discloses in Figure 2 that the multiple signals (antenna

signals 140,141) are RF signals. Refer to Column 3, lines 33-36.

Referring to claim 7, Scott does not disclose that Fs is the Nyquist sampling rate

of a highest bandwidth of the multiple signals.

Pyle discloses in Figures 1 and 4 that the MUXes are controlled by clock signals

to sample the n signals at n*Fs, where Fs is the frequency of the fastest signal. The

fastest signal has the greatest bandwidth. Refer to the rejection of claim 1. Therefore,

it would have been obvious to one of ordinary skill in the art at the time the invention

was made to include that Fs is the Nyquist sampling rate of a highest bandwidth of the

multiple signals; the motivation being since the fastest signal occupies the largest

bandwidth, a Nyquist sampling rate of the fastest signal will also be the Nyquist

sampling rate for all other slower signals, thereby fulfilling the Nyquist criterion.

Referring to claim 10, Scott discloses in Figure 2 that the step of using comprises

using the demultiplexed signals (antenna signals 166,167) in an antenna diversity

application. Refer to Column 8, line 32 to Column 9, line 10.

Referring to claim 11, Scott discloses in Figure 2 that:

The method further comprises a step of downconverting the multiplexed signals (antenna signals 130,131) to a baseband signal. Refer to Column 4, lines 37-49.

The step of demultiplexing (at splitter 160) comprises demultiplexing the downconverted baseband signal. Refer to Column 4, lines 50-52.

The step of using comprises using the demultiplexed signals (antenna signals 166,167) in an antenna diversity application. Refer to Column 8, line 32 to Column 9, line 10.

Referring to claim 12, Scott discloses in Figure 2 that the step of using comprises using the demultiplexed signals (antenna signals 166,167) in separate applications. The antenna providing the stronger signal may be used for communication until the signal quality deteriorates. Refer to Column 8, line 32 to Column 9, line 10.

Referring to claim 13, Scott discloses in Figure 2 that the step of transmitting the multiple signals (antenna signals 140,141) from separate sources. Refer to Column 3, lines 51-55.

Referring to claim 14, refer to the rejections of claims 11 and 12.

Referring to claim 15, refer to the rejection of claim 13.

3.   Claims 3, 5, 30 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,859,842 to Scott U.S. Patent No. 5,418,452 to Pyle, and in further view of U.S Patent No. 6,411,824 to Eidson.

Referring to claims 3, 30 and 34, Scott does not disclose multiplexing the multiple Signals using an SPDT switch.

Eidson discloses in Figure 9 a combiner that performs antenna diversity, which comprises a SPDT switch 920. The combiner computes the amplitudes of the incoming signals from antennas 910 and 912 and then the comparator 918 selects the larger of the two amplitudes and directs the SPDT switch 920 to select the input corresponding to the largest amplitude. Refer to Column 15, lines 21-61. The SPDT switch allows each antenna 910 and 912 to be assigned a pole of the SPDT switch so that the SPDT switch can change from one antenna to another. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include multiplexing the multiple signals using an SPDT switch, the motivation being that a SPDT switch can be turned on in two positions which allows it to switch on a separate antenna when in a certain position, thereby allowing two antennas to be used alternatively depending on their signal quality.

Referring to claim 5, refer to the rejection of claims 2, 3 and 4.

4.   Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,859,842 to Scott in view of U.S. Patent No. 5,418,452 to Pyle, and in view of U.S. Patent No. 6,701,141 to Lam.

Referring to claim 8, Scott does not disclose that the step of using comprises using the demultiplexed signals in a beam forming application.

Lam discloses in Figure 2 an IF beamformer that uses demultiplexed signals from an analog splitter 204 in a beam forming application, where each subarray 208 performs beam forming for its received signals by adjusting the phase of each of the received signals. Refer to Column 4, line 57 to Column 5, line 21. A beam forming

network adjusts the phase or amplitude of received signals to form a desired beam towards a particular direction. Refer to Column 1, lines 12-20. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include that the step of using comprises using the demultiplexed signals in a beam forming application, the motivation being that beam forming prevents multi-path transmissions and allows coherent transmission and reception of signals by directing signals in a desired direction.

Referring to claim 9, refer to the rejection of claim 11 and claim 8.

5.   Claims 16, 17, 20, 22, 25 and 27-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,859,842 to Scott in view of U.S. Patent No. 5,198,992 to McCaslin.

Referring to claim 16, Scott discloses in Figure 2 a communication receiver comprising:

A switch (Figure 2) comprising:

At least two inputs, each input configured to coupleable to at least two signal carrying devices (antennas 130,131). Refer to Column 3, lines 51-55.

A switching mechanism (summer 151) configured to multiplex signals (antenna signals 140,141) received at said inputs. Refer to Column 4, lines 34-35.

An output (backhaul cable 152) configured to carry the multiplexed signal (from summer 151). Refer to Column 4, lines 35-37.

A downconverter (not shown) comprising an input coupled to the output of the switch (summer 151) and configured to downconvert the multiplexed signal (from summer 151). Refer to Column 4, lines 37-49.

A signal processor (splitter 160) comprising an input coupled to receive the downconverted multiplexed signal (from summer 151) and an output (demultiplexed signals 166,167). Refer to Column 4, lines 50-61.

Wherein the signal processor (splitter 160) is configured to provide, at the signal processor (splitter 160) output, a data signal (demultiplexed signals 166,167) substantially corresponding to data contained in a communication signal carried by the signal carrying devices (antennas 130,131). Refer to Column 4, lines 50-61.

Scott does not disclose that the switch operates at a frequency which is substantially equal to at least twice a Nyquist required sampling rate for a bandwidth of the communication channel.

McCaslin et al disclose in Figure 1 a processing system that receives a baseband analog signal from an antenna 21. The signal goes through an analog-to-digital converter 24, which samples the received signal at twice the Nyquist rate (four times the highest expected frequency component). Refer to Column 2, lines 29-53. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include that the switch operates at a frequency which is substantially equal to at least twice a Nyquist required sampling rate for a bandwidth of the communication channel; the motivation being that sampling at two times the Nyquist sampling rate can attenuate the effects of aliasing and harmonics.

Referring to claim 17, Scott discloses in Figure 2 that the communication receiver (Figure 2) is a wireless communication receiver and the signal carrying deices are antennas (antennas 130,131). Refer to Column 3, lines 33-36 and lines 51-59.

Referring to claim 20, Scott discloses in Figure 2 the communication receiver, wherein:

The communication signal (RF signal 113) comprises a plurality of communication signals (to each antenna 130,131). Refer to Column 3, lines 33-36.

Each antenna (antennas 130,131) of the at least two antennas (antennas 130,131) is configured to receive one of the plurality of communication signals. Refer to Column 3, lines 51-55.

The signal processor (splitter 160) comprises at least two demodulators (filter/correlator 170,172 and 171,173) each configured to receive one of the at least two digital signals each corresponding to a digital representation of a portion of a communication signal (RF signal 113) of the plurality of communication signals received by one of the at least two antennas (antennas 130,131). Refer to Column 4, line 66 to Column 5, line 12 and Column 8, lines 55-59.

Each of the at least two demodulators (filter/correlator 170,172 and 171,173) are configured to provide a data signal corresponding to a signal substantially corresponding to data contained in the communication signal (RF signal 113) of the plurality of communication signals. Refer to Column 4, line 66 to Column 5, line 12.

Referring to claim 22, Scott discloses in Figure 2 a method for receiving a

communication signal (RF signal 113) a wireless communication device comprising

least two antennas (antennas 130,131), comprising:

Receiving a communication signal (RF signal 113) using least two antennas

(antennas 130,131). Refer to Column 3, lines 51-55.

Sampling the communication signal (RF signal) from each of the least two

antennas (antennas 130,131) to produce a sampled signal using a switch. The signal

may be periodically sampled using A/D sampling before transmission over backhaul

cable 152. Although a switch is not specifically disclosed, there must be some means

to perform the sampling. Refer to Column 13, lines 42-50.

Down converting the signal (RF signal 113) to generate a down converted signal.

Refer to Column 4, lines 37-49.

Generating a digitized signal from the down converted signal. The signal may be

periodically sampled using A/D sampling before transmission over backhaul cable 152.

Refer to Column 13, lines 42-50.

De-multiplexing (splitter 160) the digitized signal produce least two digital signals

(antenna signals 166,167) each corresponding communication signal as received by the

at least two antennas (antennas 130,131). Refer to Column 4, lines 50-52.

Preparing (using antenna diversity) an output signal based on the at least two

digital signals (antenna signals 166,167). Refer to Column 4, line 66 to Column 5, line

12.

Scott does not disclose the step of sampling comprises sampling at a frequency

substantially equal to at least twice a Nyquist required sampling rate for a bandwidth of

the communication signal. Refer to the rejection of claim 21.

Referring to claim 25, Scott discloses that the method further comprises the step

of demodulating each of the at least two digital signals (antenna signals 140,141).

Refer to Column 9, lines 3-5.

The step of preparing comprises combining the demodulated signals (antenna

signals 140,141) as the output signal (using combining diversity). Refer to Column 9,

lines 1-10.

Referring to claims 27-29, Scott does not specifically disclose that the method is

embodied in a set of computer instructions stored on a computer readable media and

that the computer instructions, when loaded into a computer, cause the computer to

perform the steps of the method; that the computer instructions are compiled computer

instructions stored as an executable program on the computer readable media; nor that

the method is embodied in a set of computer readable instructions stored in an

electronic signal.

However, Scott discloses in Figure 2 that each of the hardware components of

the receiver system, which reads on computer readable media, are programmed to

perform the steps of claim 22. Furthermore, the base station 164, which also reads on

computer readable media, must also be programmed to be able to determine the quality

of the received signals to determine which signal to use according to a certain antenna

diversity method. Therefore, it would have been obvious to one of ordinary skill in the

art at the time the invention was made to include that the method is embodied in a set of

computer instructions stored on a computer readable media and that the computer

instructions, when loaded into a computer, cause the computer to perform the steps of

the method; that the computer instructions are compiled computer instructions stored as

an executable program on the computer readable media; and that the method is

embodied in a set of computer readable instructions stored in an electronic signal. One

would have been motivated to do so in order to store a predetermined and programmed

routine for the system to perform antenna diversity.

6.   Claims 23 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable

over U.S. Patent No. 5,859,842 to Scott in view of U.S. Patent No. 5,198,992 to

McCaslin, and in further view of U.S. Patent No. 6,701,141 to Lam.

Referring to claim 23, refer to the rejection of claim 8. Furthermore, Scott

discloses the use of selection diversity, in which one of the at least two signals is

selected as the data output signal. Refer to Column 8, lines 43-67.

Referring to claim 24, refer to the rejection of claim 8. Furthermore, Scott

discloses that the method for receiving includes the steps of:

Determining an error (measure of signal quality) of each of the at least two digital

signals (antenna signals 166,167). Refer to Column 8, lines 43-67.

Selecting one of the at least two digital signals (antenna signals 166,167) as the

data output signal based upon an error criteria (measure of signal quality). Refer to

Column 8, lines 43-66.

Allowable Subject Matter

7.   Claims 18 and 19 are allowed.

8.   Claims 31-33 are objected to as being dependent upon a rejected base claim,

but would be allowable if rewritten in independent form including all of the limitations of

the base claim and any intervening claims.

Response to Arguments

9.   Applicant's arguments filed September 16, 2005 have been fully considered but

they are not persuasive.

Referring to the argument of claim 1 that a summer is not properly construed to

be a multiplexer (page 15, lines 15-20), refer to Figure 2 of Scott. Scott discloses that

the summer 151 combines the signals from antennas 130,131 into a backhaul signal for

transmission along backhaul cable 152. Refer to Column 4, lines 34-35. The summer

151 performs the same function as a multiplexer. A multiplexer combines two or more

signals into a single signal to transmit over a communications channel.

Referring to the argument of claim 1 that the splitter does not perform the same

operation as the demultiplexer (page 15, line 21 to page 16, line 5), refer to Figure 2 of

Scott. The splitter 160 splits the backhaul signal 152 from backhaul cable 152 into two

identical signals 166,167. Refer to Column 4, lines 50-51.   The splitter 160 performs

the same function as a demultiplexer. A demultiplexer separates signals that have been

combined by a multiplexer for transmission over a communications channel.

Referring to the argument of claim 16 that the summer does not perform any

switch-type operation (page 17, lines 11-16), refer to Figure 2 of Scott. The claim

limitation states "a switching mechanism configured to multiplex signals received at said

inputs". The summer 151 performs the function of multiplexing signals received at

inputs (130,131), so since the summer 151 is configured to perform the same function

as the claimed switching mechanism, the summer 151 reads on the switching

mechanism.

Referring to the argument of claim 16 that the splitter 160 is not a signal

processor (page 17, lines 17-24), refer to Figure 2 of Scott. The claim states "a signal

processor comprising an input coupled to receive the downconverted multiplexed signal

and an output". The splitter 160 receives the downconverted multiplexed signal (from

summer 151) and an output (signals 166,167), so since the splitter is configured to

perform the same function as the claimed signal processor, the splitter 160 reads on the

signal processor. Claim 16 does not mention a step of demultiplexing.

Referring to the argument of claim 16 that the splitter does not provide a data

signal substantially corresponding to data contained in a communication signal (page

18, lines 1-9), refer to Figure 2 of Scott. The signal processor (splitter 160) is

configured to provide, at the signal processor (splitter 160) output, a data signal (signals

166,167) substantially corresponding to data contained in a communication signal

carried by the signal carrying devices (antennas 130,131). Refer to Column 4, lines 50-

61. Since the splitter 160 receives and processes the signal from the backhaul cable

152, it also receives and processes the signal from antennas 130,131 since signals

130,131 are combined and transmitted over backhaul cable 152 from summer 151.

Referring to the argument of claim 22 that the sampling is performed using a switch, refer to Figure 2 of Scott. The signal may be periodically sampled using A/D sampling before transmission over backhaul cable 152. Although a switch is not specifically disclosed, there must be some means to perform the sampling. Refer to Column 13, lines 42-50.

Conclusion

10.   **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

11.   Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christine Ng whose telephone number is (571) 272-3124. The examiner can normally be reached on M-F; 8:00 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ricky Ngo can be reached on (571) 272-3139. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free).

C. Ng
January 10, 2006

RICKY Q. NGO
SUPERVISORY PATENT EXAMINER